**Exercise 1: Implementing the Singleton Pattern**

Logger.java

package com.example.singleton;

public class Logger {

    private static Logger instance{

    private Logger() {

        System.out.println("Logger initialized.");

    }

    public static Logger getInstance() {

        if (instance == null) {

            instance = new Logger();

        }

        return instance;

    }

    public void log(String message) {

        System.out.println("[LOG] " + message);

    }

}

TestLogger.java

package com.example.singleton;

public class TestLogger {

    public static void main(String[] args) {

        Logger logger1 = Logger.getInstance();

        logger1.log("This is the first log message.");

        Logger logger2 = Logger.getInstance();

        logger2.log("This is the second log message.");

        if (logger1 == logger2) {

            System.out.println("Both logger instances are the same (Singleton works).");

        } else {

            System.out.println("Different instances (Singleton failed).");

        }

    }

}

OUTPUT:

